Martian atmospheric data analysis: interpreting observations from Mars Global Surveyor, Mars Reconnaissance Orbiter and Mars Trace Gas Orbiter

Conference or Workshop Item

How to cite:


For guidance on citations see FAQs.

© 2011 The Authors

Version: Version of Record

Link(s) to article on publisher’s website:
http://www.ras.org.uk/events-and-meetings

Copyright and Moral Rights for the articles on this site are retained by the individual authors and/or other copyright owners. For more information on Open Research Online’s data policy on reuse of materials please consult the policies page.
Martian atmospheric data analysis: Interpreting observations from Mars Global Surveyor, Mars Reconnaissance Orbiter and Mars Trace Gas Orbiter.

S. R. Lewis¹, P. L. Read², L. Montabone², T. Ruan² and L. Steele¹

¹Department of Physics & Astronomy, The Open University, MK7 6AA
²Atmospheric, Oceanic and Planetary Physics, Clarendon Laboratory, Parks Rd, Oxford, OX1 3PU
Email: s.r.lewis@open.ac.uk

Data assimilation, the combination of observations and numerical models which provide physical constraints, and organize and propagate the observational information which is introduced, is commonly used as a means of analysing large atmospheric and oceanic observational data sets for the Earth [1] and notably to form initial states for numerical weather forecasts [2]. Data assimilation also offers significant potential advantages for the analysis of atmospheric data from other planets, which have been demonstrated by the successful assimilation of three martian years (almost six Earth years) of thermal and dust opacity observations from the Thermal Emission Spectrometer aboard Mars Global Surveyor [3]. A similar procedure is now underway with Mars Climate Sounder observations from Mars Reconnaissance Orbiter, now entering its second martian year of operations. We plan to implement the same strategy with the ExoMars Mars Climate Sounder instrument on Mars Trace Gas Orbiter [see the companion talk by Irwin et al.], but to extend the procedure to include three-dimensional dust transport, water cloud aerosol and chemical species, as is now becoming possible with terrestrial data sets [1]. This will enhance our understanding of the dynamics of the martian atmosphere and provide a consistent analysis over six martian years from different instruments using the same numerical model.